and now in the possession of Dr. Warren.* Cuvier had suggested that one vertebral bone might be wanting, (*Ossemens Fossiles,*) and then that the number would be the same as in the elephant. The dentition of the animal has been satisfactorily made out by Mr. Owen, who finds *seven* teeth belonging to the series of the lower jaw, counting from the youngest.

It may seem unnecessary to state that the genus *Tetracaulodon* of Godman†, was clearly shown by Mr. Owen,‡ in 1842, to be only the immature state of both sexes of the *Mastodon giganteus* of Cuvier, and that in the male, one, at least, and usually the right, of the two lower tusks was retained, but that in the female both were lost as she approached maturity.

IV. Botany.

1. *Vegetable Physiology.*—M. Dutrochet in connection with M. Becquerel has shown that when a Chara is subjected to the action of an electric current, the peculiar circulation of this plant ceases for a while, and is recontinued after a certain period, if the current is unchanged; it is discontinued in the same manner with each change in the intensity of the current, whether the intensity is increased or diminished.

Variations of the temperature produce nearly the same effect, and it is also apparent on transferring the plant from fresh to salt water, and the reverse.

Electro-magnetism causes no effect. The circulation is not at all influenced by an electro-magnet capable of supporting near 2000 kilogrammes, whether at the establishment or breaking of the current, the reversing of the poles, or any other mode of operation.

M. Dutrochet concludes from these facts that the circulation in the Chara depends on a peculiar *vital force*, and not at all on electricity or magnetism, as the first of these, acts like all other exciting forces, and the second not at all.

2. *Distribution of the Vestiges of Palms in the Geological formations.*—Prof. Unger, in the work here cited, states, 1st, that no vestiges of palms have been detected in the earliest rocks which contain the organic remains of maritime and terrestrial plants. 2d. That palms bore some small part in the vegetation at the period of the coal formation, in which Ferns, Lycopodiaceæ, Lepidodendreæ, Calamiteæ, Cycadaceæ, and Coniferæ appear to have formed the principal growth. He names the following forms, viz. :—

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* See also the Am. Quarterly Journal of Agriculture and Science, vol. ii, p. 203.

† Transactions of the Am. Phil. Soc., New Series, iii, 478.

‡ Proceedings of the Geol. Soc., 1842.

Flabellaria borassifolia, *Sternb.* Coal schist, Swina, Bohemia.

Palæospathe Sternbergii, *Unger.* Ibid.

P. aroidea, *Unger.* Sandstone, Ural Mountains.

Zeugophyllites calamoides, *Brongn.* Rajemahl, North India.

Two undescribed species of Gœppert, from the coal formation of Silesia.*

3d. The flora of the red sandstone, although it has been very imperfectly preserved, and its scanty remains but little studied, Unger thinks was not materially different in type from that of the coal formation. But the fossils of this era which have been referred to palms, he thinks are very doubtful. Even in the variegated sandstone, which furnishes the remains of some other Monocotyledonous plants, no palms are found; nor are there any traces of them quite up to the *quadersandstein*, in which Gœppert found some vestiges in Silesia, (Flabellaria chamœropifolia.) From an older formation, the Oolite, the four species of Carpolithes described by Lindley and Hutton, may be mentioned.

4th. Finally in the tertiary, palms reappear, and the number of species far surpasses that of all the other formations together. In the eocene formation, there are,

Flabellaria parisiensis, *Brongn.*, from the chalk, near Versailles.

Palmacites echinatus, *Brongn.* Lower chalk strata, near Soissons.

Burtinia Faujasii, *Endl.* Lieblar, near Cologne.

B. cocoides, *Endl.* Woluwe, near Brussels.

The fruits called Nipadites by Bowerbank, belong to the same formation. In the miocene formation, we have—

Flabellaria Latania, *Rossm.;* "in arenaceo lignitum," at Altsattel, Bohemia.

F. raphifolia, *Sternb.;* in bituminous calcareous schist, at Häring, in Tyrol, Lausanne, Switzerland, and Piancourt, near Amiens.

F. oxyrhachis, *Ung.* Häring, Tyrol.

F. verrucosa, *Ung.* Ibid.

F. ? crassipes, *Ung.* Ibid.

F. Martii, *Ung.* Ibid.

F. major, *Ung.* Häring, Tyrol.

F. Hœringiana, *Ung.* Ibid.

F. maxima, *Ung.* In argillaceo-calcareous schist, at Radab, Croatia.

F. Lamanonis, *Brongn.* Gypsum schist. Provence.

Phœnicites pumila, *Brongn.*, among lignites, at Chartreuse, Puy en Velay.

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* As respects palm fossils of this age, see Brongniart, in Comptes Rendus, Dec. 1845, and in Ann. and Mag. Nat. Hist., Feb. 1846.

P. spectabilis, *Ung.* Calcareo-argillaceous schist, Radab.
P. salicifolius, *Ung.*, "in arenaceo lignitum," Altsattel.
P. angustifolius, *Ung.* Ibid.
Fasciculites didymosolen, *Cottæ*, *Ung.* Litmitz, Bohemia.
F. Cottæ, *Ung.* Locality unknown.
F. anomalus, *Ung.* do.
F. ? lacunosus, *Ung.* do.
F. palmacites, *Cottæ.* Tertiary at Chemnitz? Antigua?
F. perfossus, *Ung.* Altsattel, Bohemia.
F. Partschii, *Ung.* Locality unknown.
F. Fladungii, *Ung.* do.
F. sardus, *Ung.* Bonarvo, Sardinia.
Baccites cacoides, *Zenk.* Altenburg, Saxony.
B. rugosus, *Zenk.* Ibid.
Endogenites. Brongn. Prodr. p. 208. Horgen, near Zurich.

In the pliocene formation, there are—

Flabellaria antiguensis, *Ung.* Island of Antigua.
Palmacites crassipes, *Ung.* Ibid.
Fasciculites antiguensis, *Ung.* Ibid.
" Withami, *Ung.* Ibid. A. Gr.

3. *Analogy between the Flora of Japan and that of the United States.*—Prof. Zuccarini, the author, in conjunction with Dr. Siebold, of the excellent *Flora Japonica* now in progress, (which we have more than once noticed in this Journal,) has recently published the first part of a brief memoir, entitled, "*Floræ Japonicæ familiæ Naturales, adjectis generum et specierum exemplis selectis:* Sect. 1, *Plantæ dicotyledoneæ polypetalæ.*" It is interesting to remark how many of our characteristic genera are reproduced in Japan, not to speak of striking analagous forms. Thus the flora of Japan has not only Wistaria, Lespedeza, Sieversia, Chimonanthus (in place of our Calycanthus), Philadelphus, several species of Rhus closely resembling our own, and two peculiar genera of Juglandeæ, but also a Pachysandra, some Berchemias, a Staphylea, and a peculiar genus of the tribe (Euscaphis), besides, not only a dozen Maples but also a Negundo, a Stuartia, two Tilias, a Phytolacca, an Opuntia (surely not indigenous?), a Sicyos referred to our own S. angulata, two Droseras, a Nelumbium, a Nuphar and two species of Nymphea, Gynandropsis, a real Dicentra (Dielytra) and an allied new genus, with several species of Corydalis, a Trollius, our own Coptis and two new ones like the western C. asplenifolia, an Isopyrum, two species of Aquilegia, one of them near A. canadensis, a Cimicifuga, a Trautvetteria, an Illicium, some Magnolias, Kadsura and Sphærostemma in place of Schizandra, a Mitellopsis, two species of Astilbe (Hoteia), many Hydrangeas as well as peculiar

Hydrangeaceous forms, a Hamamelis with two other characteristic genera of the family, some true Dogwoods, as well as Benthamia the analogue of our Cornus florida, some true Vines, and two species of Ampelopsis, three species of Panax, and four of Aralia, one of which is near our A. nudicaulis: and among Umbelliferæ are Hydrocotyle, Sanicula, Sium, Angelica, but what is most remarkable, Cryptotænia, Archemora, and Osmorhiza! Further cases of generic conformity abound in the remaining divisions of the vegetable kingdom; thus, for example, Diervilla, Mitchella, Maclura, Liquidambar, Torreya, and Sassafras! are represented in the flora of Japan. A. Gr.

4. *Conspectus of the Fossil Flora.*—Prof. Unger, in his *Synopsis Plantarum fossilium*, pp. 296, 297, and also in his treatise *De Palmis fossilibus*, contributed to the 8th fasciculus of the great work of Martius on palms, gives the subjoined summary of the number of fossil species now known, under the several classes to which they are supposed to belong.

Algæ,	119	Aquaticæ,	1
Characeæ,	6	Iulifloræ [Amentaceæ, etc.],	93
Lichenes,	1	Oleraceæ,	1
Fungi,	9	Thymeleæ,	17
Musci,	2	Contortæ,	11
Calamariæ [Equisetaceæ and Calamiteæ],	109	Nuculiferæ,	1
Filices,	444	Petalanthæ,	1
Hydropterides [Sphenophyllum],	11	Discanthæ,	1
Selagines [Lycopodiaceæ, Lepidodendreæ, etc.],	207	Polycarpieæ,	1
Zamieæ,	100	Nelumbia,	2
Glumaceæ,	11	Peponiferæ,	1
Enantioblastæ,	2	Columniferæ,	14
Coronariæ [Lilia],	13	Hesperides,	2
Scitamineæ [Musaceæ],	14	Acera,	19
Fluviales,	21	Frangulaceæ,	4
Spadicifloræ [Pandanocarpum etc.],	18	Tricoccæ,	1
Principes [Palmæ],	43	Terebinthineæ,	20
Coniferæ,	141	Calycifloræ,	5
		Myrtifloræ,	2
		Rosifloræ,	2
		Leguminosæ,	45
		Plantæ incertæ sedis,	118
		Numerus omn. spec.	1648

The *classes* here given are those adopted by Endlicher. A. Gr.